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[54] AXIAL FLOW BLOOD PUMP WITH
HYDRODYNAMICALLY SUSPENDED
ROTOR

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Related U.S. Application Data

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[57] ABSTRACT

An axial flow blood pump for intracorporeal or extracorporeal use pumps blood axially through a cylindrical conduit disposed in the bloodstream of a patient. The pump further includes a pump stator mounted in the conduit and a motor stator located either externally or internally of the conduit which applies a magnetic flux in the conduit. A rotor located in the conduit carries permanent magnets which interact with the applied magnetic flux to rotate the rotor. The rotor also carries impeller blades which, during rotation, produces an axial flow of blood through the conduit. During rotor rotation, the rotor is radially suspended solely by one or more hydrodynamic bearings formed by blood flowing through the conduit, with the location of at least one hydrodynamic bearing defined by a radial gap between the inside surface of the conduit and the rotor. By radially suspending, or floating, the rotor on blood in the conduit, the size of the pump may be reduced and the need for radial bearings, radial bearing seals and/or a supply of purge fluid is eliminated.

44 Claims, 14 Drawing Sheets

